Shell Martinez Refinery Biotreater (ETP-1)
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Background:

SMR operates an unlined surface impoundment (aka ETP-1 or Pond 7 or biotreater) with a maximum storage capacity of 3.8 million gallons and an average depth of 9 feet. ETP-1 functions as an aggressive biological treatment unit at the SMR Wastewater Treatment Plant. SMR has always used ETP-1 for the biological treatment of the wastewater. Prior to 1998, ETP-1 received benzene characteristic hazardous waste. ETP-1was never retrofitted to meet the minimum technology requirements (MTRs) for surface impoundment (e.g., liner system, leachate collection and removal system) required in 3005(j) of RCRA because SMR received an exemption from DTSC. SMR claimed that beginning in 1998 (after SMR built above ground tanks to treat process wastewater), ETP-1 ceased to receive wastewater that is greater than the hazardous wastes level of benzene (0.5 mg/L of benzene) because the process wastewater was routed to the tanks for treatment. Currently, ETP-1 is a RCRA unit under delayed closure and is not permitted to receive non-hazardous waste streams.

ETP-1 has a long regulatory history. Here is what EPA could piece together based on the documents in the DTSC permit file.

Date	Correspondence Summary	Notes:
Nov. 15, 1991	SMR requested from EPA a Class 1 modification to its RCRA permit to add Biotreater to Part A permit	Nov. 6, 1991, EPA internal memo recommended enforcement action because of benzene greater than TC level entering biotreater. Dec. 23, 1991, SMR data showing TC level benzene wastewater entering biotreater No enforcement action was taken on the violation.
Dec. 19, 1991	EPA denied interim status request and required temporary authorization and Class 3 modification	
Dec. 27, 1991	SMR made temporary authorization request to EPA	
Feb. 10, 1992	DTSC granted interim status to SMR	
Mar. 14, 1992	SMR submitted documents to EPA, finalizing Class 3 modification request	Engineering report for the biotreater, March 1992
Mar. 19, 1992	EPA granted SMR RCRA temporary authorization	
Mar. 27, 1992	SMR applied for Minimum Technology Requirements (MTR) exemption to EPA	
Aug. 21, 1992	DTSC received RCRA authorization from EPA	Report Evaluation of Alternatives to the Biotreater, June 1992
Sept. 15, 1992	DTSC granted RCRA interim status to SMR	
Mar. 21, 1994	DTSC granted exemption for MTRs, but noted deficiencies needed to be addressed by SMR.	Couldn't locate the deficiencies letter.
Nov. 20, 1995	SF Bay Regional Water Quality Control Board issued waste discharge order 95-234 which includes groundwater monitoring program for SMR site wide corrective action units.	
Dec. 1995	DTSC issued RCRA permit for biotreater	

Apr. 6, 1998	SMR submitted class 2 permit modification for delay of closure for biotreater to DTSC	
Dec. 28, 2001	SMR provided DTSC with supporting information for Biotreater delay of closure application	August 12, 2002, DTSC issued notice of deficiency for the delay of closure application Sept. 12, 2002 SMR responded to the deficiency findings Nov. 27, 2002. DTSC issued 2nd notice of deficiency Feb.14, 2003, SMR responded June 5, 2003, SMR prepared meeting summary regarding agreement on approval of delay of closure
Aug. 21, 2003	DTSC granted delay of closure on the biotreater	
Dec. 2005	SMR semiannual benzene sampling showed hazardous wastes entering biotreater. SMR reported noncompliance to DTSC and was told by DTSC permit writer to re-sample.	No violation of hazardous waste into ETP-1 was cited, no enforcement action taken by DTSC.

Current Status of ETP-1

- 22 CCR §66264.113 (e)(2) requires the removal of hazardous waste sludge from the surface impoundment for closure of the unit. However, at the time DTSC issued its delayed closure permit in 2003, DTSC didn't require SMR to meet this requirement.

- Under the permit condition, SMR conducts semi-annual monitoring of its feed stream into ETP-1 (analysis of one composite sample comprised from four grab samples for each monitoring event) for TCLP BTEX. If a waste stream is deposited into a surface impoundment that contains benzene greater than 0.5 mg/L, the waste stream would become subject to land disposal restrictions (LDRs) unless it qualifies for an exemption.

- Under the Regional Water Quality Control Board Waste Discharge Order (R2-2014-0025 which superseded waste discharge order 95-234), SMR monitors eight (8) groundwater wells semiannually for metals, TPH, BTEX and semivolatiles/phenols. One of the eight wells (Well 228) has been showing benzene concentrations exceeding the hazardous waste level of 500 ppb for benzene from 2005 to present. The Order does not require any actions if exceedances are found. This is inconsistent with §66264.113 (e)(4) which requires the implementation of corrective measures when the release is detected in groundwater monitoring.

EPA's concerns and SMR's responses

- EPA is concerned that neither the Regional Board's Order nor DTSC's delayed closure permit require corrective measures when a release is detected in the groundwater monitoring.

- EPA thinks SMR should adequately characterize the feed stream into the ETP-1 and the existing accumulation of hazardous waste in ETP-1, in addition to the groundwater monitoring, and address any issues, if appropriate.

- In EPA's December 2016 NOV, EPA cited SMR for managing hazardous wastes in ETP-1 under a permit violation. In response, SMR claims the following:
    - SMR claims the bay mud which is the key earthen material in ETP-1 provides a barrier and serves as equivalent to an impermeable liner to prevent potential release of hazardous wastes into the environment. However, the geological profiles provided by SMR doesn't support this statement. EPA's guidance "Design Construction and Evaluation of Clay Liners for Waste Management Facilities' and 40 CFR §264.221(c) requires a permeability of no more than $1x10^{-7}$ centimeter/second. Information provided by SMR showed the vertical hydraulic conductively of the fill material, that which is in direct contact with the wastewater, is on the order of $1x10^{-6}$ cm/sec. The horizontal hydraulic conductivity of the fill material was recorded as high as $1x10^{-4}$ cm/sec. The fill material reportedly ranges in depth from 3 to 12 feet. The other vertical hydraulic conductivities available were for Bay Mud, stiff to hard clay, and Alluvium, which were all on the order of $1x10^{-6}$ cm/sec.

    - SMR also claims the high level of benzene in Well 228 was not due to the release from ETP-1 because Well 228 is an up-gradient well from ETP-1 and the high benzene level was due to historic releases in the area. However, due to the confounding groundwater flow pattern due to the groundwater treatment system at SMR, the groundwater flow direction varies (SMR agrees with this statement). SMR couldn't provide evidence to support their statement that the benzene level in Well 228 was not attributed to ETP-1. Further, SMR couldn't tell EPA which well(s) is(are) directly associated with ETP-1 and ETP-1 only. 40 CFR §270.17 specifically requires detailed design plans for Construction Quality Assurance and Control from owner/operator to ensure that migration of hazardous waste is prevented. Given the complex hydrogeology near this surface impoundment, design plans are imperative. SMR has not provided design plans to demonstrate that the migration of hazardous waste is prevented.

- In SMR's meeting with EPA on March 27, 2017, SMR indicated that ETP-1 had not received any hazardous waste level of benzene wastewater since 2003. Meanwhile, the SMR's non compliance report indicated at least in 2005, there was exceedance in two consecutive days. EPA has monitoring data from 2014-2016 which showed non -exceedance of the semi-annual composite samples.

Next Steps

- **3013 Order**. EPA could issue RCRA 3013 order to order SMR to conduct/compile studies to determine how to address any hazards associated with ETP-1.

- RCRA Section 3013(a) provides that "If the Administrator determines, upon receipt of any information, that (1) the presence of any hazardous waste at a facility, or site at which hazardous waste is, or has been, stored, treated, or disposed of, or (2) the release of any such waste from such facility or site may present a substantial hazard to human health or the environment, he may issue an order requiring the owner or operator of such facility or site to conduct such monitoring, testing, analysis, and reporting with respect to such facility or site as the Administrator deems reasonable to ascertain the nature and extent of such hazard."

- EPA could order SMR to submit a Work Plan for the sampling, analysis, monitoring and reporting of the hazardous wastes and hazardous constituents that are present at or that may have been released from ETP-1 for EPA's approval. The Work Plan could contain, but is not limited to, the following tasks:

    a. A plan to evaluate the adequacy of the existing monitoring wells (up-gradient and down-gradient) associated with the biotreater (ETP-1) for the purpose of monitoring the potential release from ETP-1 and ETP-1 only;
    b. A plan to perform additional groundwater monitoring activities to monitor the potential release from ETP-1 biotreater, if necessary;
    c. A description of the method for determining release from ETP-1;
    d. Selection of the action levels for the monitoring wells associated with the ETP-1 biotreater and corrective measures (actions) required when the levels are reached;
    e. A plan to sample the feed stream to the ETP-1 for TCLP VOC and metals at a higher frequency;
    f. A plan to sample the sediment/sludge accumulation in ETP-1 for TCLP metals and TCLP VOCs at the following depths (surface water, surface sludge, ½ depth of the accumulation layer, and bottom of the accumulation layer).
    g. The work plan could include a schedule for completing each of the tasks identified above.

- **Permit Modification** SMR RCRA permit expires on May 20, 2018. The permit renewal call letter went out in August 2017. DTSC is currently waiting for the permit renewal application package from SMR. ETP-1 delayed closure unit would be the only unit in this upcoming permit. DTSC expressed willingness to work with EPA to make sure all issues associated with this unit are adequately addressed in the upcoming permit. Information gathered pursuant to a 3013 order may be informative in addressing the hazard posed by ETP-1.